

SOURCE

Magazine of Extension research & education Fall 2013

Seeing Patterns

**MARK SEELEY CHARTS MINNESOTA'S
CHANGING CLIMATE**

4-H alumni give back
to communities

Safer food, from
farm to fork

Community roadmap
to economic success

SOURCE

FALL 2013

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 UNIVERSITY OF MINNESOTA | EXTENSION



Signs of climate change



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ON THE COVER: Climate data have a story to tell, but it takes expertise to connect the data and discover the patterns. Mark Seeley, Extension climatologist since 1978, says Minnesotans are seeing and feeling many signs of a changing climate.

Source is published twice a year and is available online at extension.umn.edu/source.

For more information on programs and services, visit our website at extension.umn.edu.

University of Minnesota Extension mission: Making a difference by connecting community needs and University resources to address critical issues in Minnesota.

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From the Dean

Together, we create a stronger Minnesota

Extension's unique role in Minnesota is reflected in our name. Extension, extending the University into all parts of the state to address the most pressing issues with research and education that changes lives.

Our reach into every Minnesota county results in unique University-community relationships that multiply our individual efforts into a collective force for positive change.

We engage. We collaborate. We partner. Together, we create a better Minnesota.

This issue of *Source* highlights many ways we extend the University into communities and bring the knowledge of Minnesota back into our laboratories and classrooms.

Learn how Extension climatologist Mark Seeley helps Minnesotans respond and adapt to challenges brought by a changing climate.

Find out how 4-H teaches young people to lead, giving back to their communities

throughout their lives, as 4-H alumni. Margaret Anderson Kelliher, former speaker of the Minnesota House of Representatives, and Harlan Madsen, Kandiyohi County commissioner, explain.

See how an Extension food safety researcher minimizes the risk of food-borne illness, bringing together University researchers, Minnesota food businesses and food inspectors to discover solutions from farm to fork.

Keep turning the pages to learn how Minnesota cities and regions use Extension's community-specific economic development research to create their own unique future, and how investments in teaching low-income families how to cook pay back with better health.

Read about Extension friends whose gifts to Extension make a difference in their communities. I invite you to return the

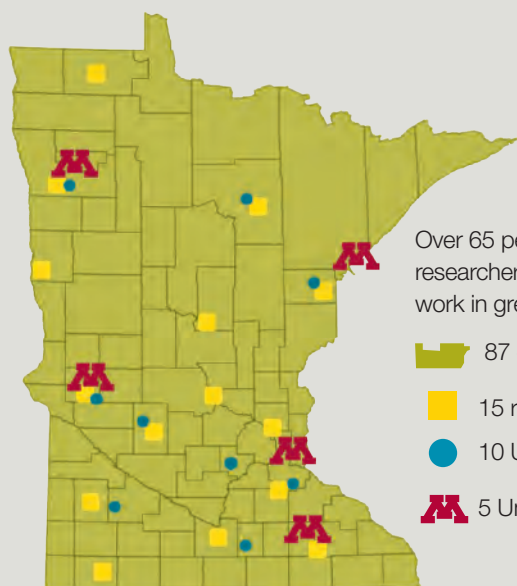


Bev Durgan, Dean

enclosed giving envelope. Each donation helps Extension expand research and education to solve problems and create a brighter future.

Sincerely,
Bev Durgan
Dean, University of Minnesota Extension

Extension Connects the University With Minnesota



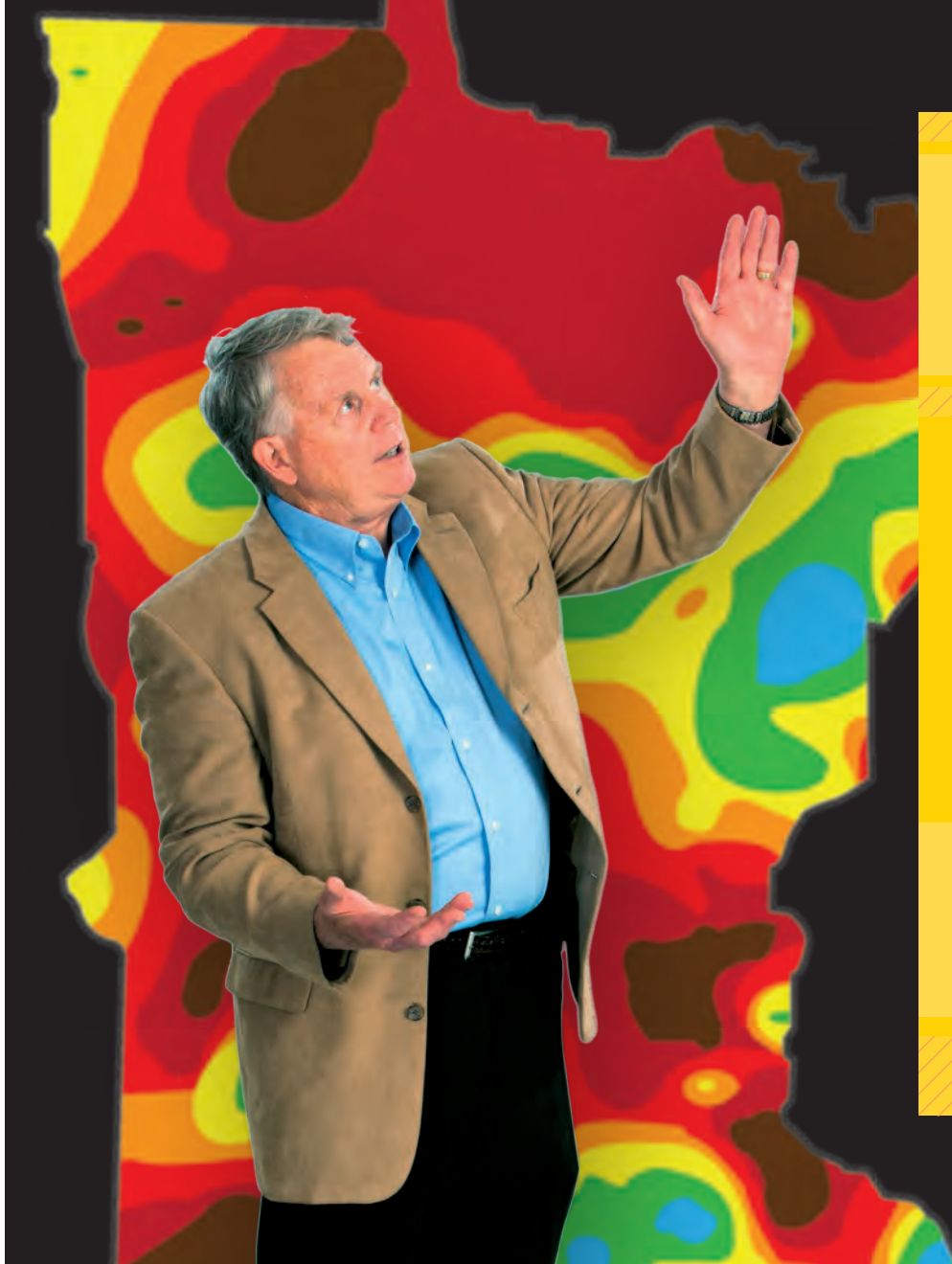
Over 65 percent of Extension's 800 researchers, educators and staff live and work in greater Minnesota. Located at:

- 87 county Extension offices
- 15 regional Extension offices
- 10 University research & outreach centers
- 5 University campuses

Creating a Stronger Minnesota Through Education and Research



- RESEARCH** Discovering science-based solutions that work
- EDUCATION** Helping people develop knowledge and skills to solve problems
- VALUE** Building a stronger Minnesota and a brighter future



HAVE YOU NOTICED

- ☐ milder winters
- ☐ intense 4–8” thunderstorms
- ☐ more heat advisories



2012 WEATHER FACTS

76 counties declared severe to extreme **drought**, while 55 declared **flood** emergency

Over 700 **warm-temperature records** in one month

Third 1000-year **flash flood** since September 2004

When weather disaster strikes, visit extension.umn.edu/extreme-weather for preparation and recovery information

SEEING PATTERNS

Mark Seeley charts Minnesota's changing climate

Climate matters to Minnesota. Transportation, agriculture and recreational infrastructures are all based on it. Extension helps Minnesotans respond to new challenges caused by changing weather patterns.

The times they are a-changin', goes the old Bob Dylan song. The climes are changing too. Have you noticed? Extension climatologist Mark Seeley sure has.

Climatologists have recorded temperatures on a statewide basis for 119 years, yet seven of Minnesota's 10 warmest years have occurred in the last 15 years.

2012 was the third hottest on record for Minnesota, and the hottest ever for the 48 contiguous states. Moorhead was the hottest place on the planet at 6 p.m. on July 19,

2011, with a heat index of 134 degrees.

Nobody knows Minnesota's climate better than Seeley. He is heard weekly on Minnesota Public Radio, and regularly in public forums, including the Minnesota Legislature, where he helps decision-makers understand the implications of changing weather patterns.

At heart, he's a scientist who follows the data. "I'm a measurement guy, so when I see changes in data from our own backyard, I take notice," he says.

Hot and humid

Higher dewpoints, which translate into higher heat index values, is one change Seeley notices. Even Voyageurs National Park, in northern-most Minnesota where people go to escape summer heat, is becoming steamier.

The National Weather Service has issued more heat advisories in recent years due to higher dewpoints. High heat can severely stress livestock—not to mention humans. Milder winters also mean more insects and plant diseases survive and thrive rather than dying off each year.

It's not all bad; higher temperatures also translate to a longer growing season. In fact, the U.S. Dept. of Agriculture changed plant hardiness zones in 2012 for the first time in 20 years, allowing for a wider range of plants that can now survive in northern zones.

Flood and drought merry-go-round

Today's growers need to choose plants that can withstand the combination of drought and heavy rains brought by climate change. Records show that annual precipitation is

increasing in most places, and more comes from intense thunderstorms. These bursts of rain bring more flash floods, increased soil erosion and saturated crop fields.

Minnesota has experienced its share of floods in the last 20 years. Southern Minnesota saw three 1,000-year flash floods in the last nine years, while parts of the Red River Valley have reported six of the top 10 spring snowmelt floods since 1997.

At the same time, Minnesota has experienced historic droughts. By the end of the 2012 growing season, 76 of Minnesota's 87 counties were in severe to extreme drought. At the same time, 28 counties suffered the effects of flooding. Crop yields were reduced, aquifers ran low or dry, and drought exposed some landscapes to wildfire risk.

Coping with climate change

Seeley believes that Minnesotans need to adapt to climate change community by community. "We face important questions," he explains. "Will we protect a city from floods by building a more robust storm sewer system, or is it too expensive? How

much should a farmer invest for tile drainage systems to manage such extreme variations in rainfall?"

On a broader note, Seeley wonders if people will support long-term preservation of natural resources systems. "We're already changing the way we stock fish—using a different mix of species—due to climate change. What other accommodations are we going to make?" he asks. "Are we going to manage our resources so that future generations can enjoy Minnesota's lakes, streams and natural beauty to the same extent that we have?"

If Seeley has his way, that answer will be a resounding yes.

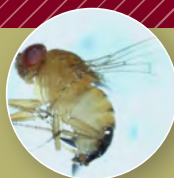
NOTE: Mark Seeley will present at the first Conference on Climate Adaptation, November 7, 2013, at the Science Museum of Minnesota. Professional planners will learn about climate adaptation strategies in transportation infrastructure, natural resources, public health and agriculture. For more information, visit www.extension.umn.edu/environment/climate

Milder winters bring uninvited pests

Insects have always come to Minnesota as tourists, according to Jeff Hahn, Extension entomologist. "A variety of insects are arriving all the time, on the wind, on human travelers or in foreign cargo." Changing weather patterns can make it easier for them to survive the winter and reproduce, possibly becoming invasive, especially if no natural predator exists for them here.

Even insects that can't survive the winter may arrive earlier in spring and stay through harvest season, causing more damage.

Extension does the research, and then educates producers on ways to deal with these uninvited pests.



Spotted wing drosophila *suzukii*

Fruit fly from Asia damages Minnesota's fruit and berry crops.

Extension monitors crops and teaches growers to identify and manage.



Western corn rootworm *Diabrotica virgifera virgifera*

Pest from southern North America causes up to \$1 billion in lost revenue.

Extension studies crop rotation and variety selection to reduce impact.



Potato leafhopper *Empoasca fabae*

Sap-sucker feeds on soybeans, alfalfa, beans, ornamentals and potatoes.

Extension teaches growers to prevent infestations.

4-H alumni give back to Minnesota communities



Margaret Anderson Kelliher first put her talents and skills into service for others as a 4-H'er coming of age during the Farm Crisis. The former 4-H youth state president later served as speaker of the Minnesota House of Representatives. She currently leads an effort to make Minnesota one of the country's top five technology states.

All youth have the ability to lead, and 4-H makes sure it happens. In fact, 4-H youth are three times more likely to contribute to their communities. That's because 4-H is designed to bring out a young person's unique ability to lead and succeed. And, 4-H alumni continue to contribute long after graduating from 4-H.



In the early 1980s, when the Farm Crisis descended on rural Minnesota, a teenage farm girl worried. She could have found any outlet to cope, for better or for worse. Fortunately, she had 4-H in her life, and learned to make constructive use of her experience to help others.

That girl was Margaret Anderson Kelliher, former speaker of the Minnesota House of Representatives, and current president of the

Minnesota High Tech Association. Through 4-H, she found the opportunity to speak to other young people about family stress and how to reach out for help. "That was really important for me: learning how to lead through adversity," she says.

Anderson Kelliher draws a direct line from her 4-H leadership experience to leading a diverse House of Representatives in the mid-2000s.

“Leadership is the ability to bring forth a vision,” says Dorothy Freeman, Extension associate dean for youth development. “4-H is unique in how we engage young people in a process to bring out their own abilities so they can give back. Ultimately, leadership is about contributing.”

Learning to lead

Anderson Kelliher says her 4-H experience in rural Blue Earth County illustrated the value of 4-H’s approach: “I got to progress on—from elementary and high school through my first year in college.”

According to Freeman, young 4-H’ers are engaged in age-appropriate development early on. “Whether it’s a 9-year-old assigned to the snack committee or a high school junior serving as a 4-H club officer, they start with making small decisions, setting goals with others and learning to lead,” she says.

For Anderson Kelliher, in the early 1980s those goals took on a serious tone. “It wasn’t just about happily leading meetings and getting great projects done. It was about putting my head, heart, hands and health into service, as 4-H’ers pledge to do.”

Like Anderson Kelliher, Kandiyohi County Commissioner Harlan Madsen, who was a 4-H’er in the 1960s, remembers the first 4-H meetings he chaired. For Madsen, it was in eighth grade at a meeting at Lake Lillian Elementary School.

“The adult leader told me afterwards that I did a good job, but I remember to this day that I was scared witless. What I learned in 4-H was that I could do that—whatever it was—with encouragement and training,” he says. “We didn’t have the terminology for it back then, but we were learning about leadership.” Today, Madsen is serving his 19th year as county commissioner, and he raises cattle and grows crops on the family farm.

Anderson Kelliher understood how much she drew on her 4-H experience early in her time at the Legislature. “After one of the first speeches I ever gave on the House floor, another member came up to me and asked, ‘Where did you learn to speak so well?’” she recalls. “I realized it was my 4-H training—I was a food and dairy demonstrator at the summer fairs. That taught me how to speak in front of others.”



Harlan Madsen, 4-H alumnus and Kandiyohi County commissioner of 19 years, finds it rewarding to support young 4-H’ers as they learn skills needed to serve their communities and bring about their own vision of success. Pictured at left: 1967 photo of Madsen showing his cow during his last year in 4-H. Pictured at right: Madsen with 4-H member Ashley Swanson.

Building our future

“When I look back, we were being taught accountability, responsibility, respect, process and skills like public speaking,” Madsen says. “Most people are not born with leadership skills. It’s something that’s developed through opportunities that allow our youth to begin serving early on. That’s how we’re building our future.”

“This generation of youth is looking to have a strong purpose in this world, and doing it collaboratively,” says Jennifer Skuza, Extension assistant dean for youth development. “We give them the opportunity through small group learning.”

Anderson Kelliher makes a connection between the 4-H model and the employees sought by members of her association. “In the technology world, so much of the work is both hands-on and strategic. This is what 4-H does. Communities should invest in organizations like 4-H because this is what you want the future workforce to look like.”

To volunteer or join 4-H, visit www.4-H.umn.edu

MINNESOTA 4-H PLEDGE

I pledge
my **HEAD** to
clearer thinking,
my **HEART** to
greater loyalty,
My **HANDS** to
larger service,
my **HEALTH** to
better living,

for my family,
my club,
my community,
my country
and my world.



Ensuring safer food, from farm to fork



Extension food scientists help companies implement food safety practices that prevent outbreaks of foodborne illnesses. Pictured from right: Extension's Joellen Feirtag and Holly Andruschak consult with Rhonda Breuer, quality assurance manager, while Vieng Teso and Vang Her prepare ready-to-eat food according to best food safety practices at Supermom's Bakery.

Foodborne illnesses are on the rise. Each year nearly 48 million people get sick from food poisoning. While the U.S. food supply is among the safest in the world, tiny organisms that you can't see, smell or taste are everywhere in the environment. Extension teaches food producers, distributors, restaurants and consumers how to keep food safe from farm to fork.

"Foodborne illnesses aren't caused by lack of desire to keep food safe, but lack of knowing how to keep it safe," says Joellen Feirtag, a microbiologist and Extension food safety specialist who is improving food safety along the entire food chain in Minnesota and beyond. "When farmers, food processors,

grocers and food servers understand what they need to do, and why, they follow through. Then problems don't occur."

People often become aware of food safety when large numbers of people get sick or die and businesses close. "Preventing outbreaks saves lives and businesses," she says.

Prevention matters

A new federal act now makes prevention a priority in making food safer. Feirtag is working with state legislators, government administrators and food businesses to understand what the act means for Minnesota. "It requires greater awareness and

planning," she says. "It's a good thing when prevention gets its due."

Prevention is the top priority for Minnesota-based Coborn's Inc. Kim Kockler, Coborn's food safety manager, uses Extension research and education to ensure that food is safe in all 47 stores.

"I make sure food safety is the foundation of all we do to ensure customer confidence in the food they purchase from us," says Kockler.

Kockler contracts with Feirtag and Holly Andruschak, Extension associate program director, to assess food safety risks and opportunities. Most recently, Feirtag and Andruschak recommended that Coborn's

pilot the use of electrolyzed water in five stores. The cleaning solution, created with water and brine in a special machine, is used to wash fruits and vegetables and mist produce so it stays fresh longer. It's also used to clean deli slicers and ice machines, which can harbor those tiny pathogens. Feirtag helped bring this Russian innovation to Minnesota's food businesses, beta testing it at SuperMom's Bakery, another Minnesota company.

Working together to improve food safety

The entire food chain benefits when members share food safety research and best practices. Feirtag facilitates that sharing through monthly Food Safety Roundtable meetings where University, industry and government food professionals discuss topics like food procurement, monitoring for pathogens and proper food storage.

"Extension's Food Safety Roundtables support businesses trying to navigate the world of regulations, and help regulators understand the real-world concerns of business," says Patti VonderHaar, quality assurance manager with Pouchtec Industries in Foley, Minn. "It's not just about listening at meetings, but really working together."

Feirtag agrees: "Food safety isn't competitive. The great thing about Minnesota's food industry—about 2,300 companies—is that they all know that a safer food supply is critical for everyone's bottom line."

That includes the customer's bottom line. When businesses prevent expensive problems, they can keep food more affordable for all.

Electrolized water replaces chemical cleaners

Electrolized water is a Russian innovation that Extension's Joellen Feirtag brought to Minnesota after extensive research. An electrical activation system produces a pH-neutral solution that can be sprayed as an equipment cleaner and sanitizer, or directly on foods to destroy bacteria like E. coli. "This system can be used from the farm to the retail market—from washing the harvest, to cleaning in processing plants and misting in grocery stores," Feirtag said.



Food contamination: How does it happen?

ON THE FARM

Produce watered or washed with bacteria-contaminated water

Animals harvested for meat with bacteria in the intestinal tract

DURING PROCESSING

People handling food with unwashed hands

Contaminated food processing equipment

BEFORE EATING

The same utensils used for multiple foods, transferring bacteria

Food left out of the refrigerator for too long or not cooked properly



Extension prevents food contamination by teaching producers, food processors and food service workers how to harvest, store, process and prepare food safely.

Investing in Extension creates a stronger Minnesota

Donors' generous support for Extension research and education cultivates a brighter future

A Master Gardener teaches volunteers how to build a community vegetable garden.

A new leader engages her city in building a much-needed bus shelter.

4-H youth study the water quality of local lakes.

Extension's impact is visible throughout Minnesota. But what's often unseen is the role generous donors play in achieving the results.

"It all comes down to the land-grant mission of the University of Minnesota," observes Jane Johnson, Extension development director. "Extension works in every county and offers a wide range of education that people are passionate about."

Pat and Francis Buschette of Renville County saw just such an opportunity in Extension's leadership education. The Buschettes are deeply committed to leadership, agriculture and Minnesota

communities. Their generous gift to Extension created the Patricia and Francis Buschette Leadership Fund, providing scholarships to participants in Extension leadership programs. This support will help cultivate the next generation of leaders throughout Minnesota.

"Our future depends on leaders who are prepared," says Pat Buschette. "Extension provides participants the opportunity to understand the unique contributions of Minnesota communities and the tools to identify and develop their skills. With this understanding, they enhance their ability to work with others and build on accomplishments."

Extension helps communities and regions capitalize on their assets. Gifts such as the Buschettes' build the foundation of local leaders needed to deal with Minnesota's changing landscape, economy and demographics.



Pat (right) and Francis Buschette created a scholarship for developing leaders, like Jan Jackola (left) and Deade Johnson.

"The need for private support is only going to grow," Johnson says. "Many people see what a tremendous asset Extension is to their communities. Donors can support whatever part of Extension's work they are passionate about—agriculture, leadership, youth, gardening, communities, environment and families. Extension education and research touches all parts of Minnesota."

Visit www.extension.umn.edu/about/donate, or call (612) 624-7971 to speak to Jane Johnson, Extension development director, or Cara Miller, executive director of the Minnesota 4-H Foundation.

GENEROUS GIFTS SEND 4-H'ERS TO COLLEGE

Flexibility allows donors to create gifts that reflect their priorities.

Examples of scholarships made possible by donors through the Minnesota 4-H Foundation:

VIOLET KERN SCHOLARSHIP

Provides on-going support to eight 4-H'ers each year as they pursue studies anywhere at the University of Minnesota or Minnesota State Colleges and Universities

EDWARD H. SCHULTZ SCHOLARSHIP

Designed to support 4-H'ers from Le Sueur and Nicollet counties to pursue agricultural studies at any post-secondary institution

ANDREA RUESCH SCHOLARSHIP FUND

Provides education funds for 4-H'ers in a 10-county area in southwestern Minnesota



THE ROADMAP TO ECONOMIC SUCCESS

When it comes to economic development, each Minnesota community is different. “What works in one place can become a regrettable decision in a different town,” explains Matt Kane, Extension’s community economics program leader. “It’s vital that communities make decisions based on their specific situation.”

Lindstrom

In 2008, when Lindstrom city leaders wanted to strengthen the city’s appeal as a tourist attraction, they turned to Extension to conduct research on Lindstrom’s opportunities and challenges.

In the last five years, Lindstrom has implemented several of the ideas from that research: A bicycle trail has been completed. A former farm has been purchased to broaden lodging options. And, the city has completed projects that leverage the tourism pull of Lindstrom’s Swedish heritage.

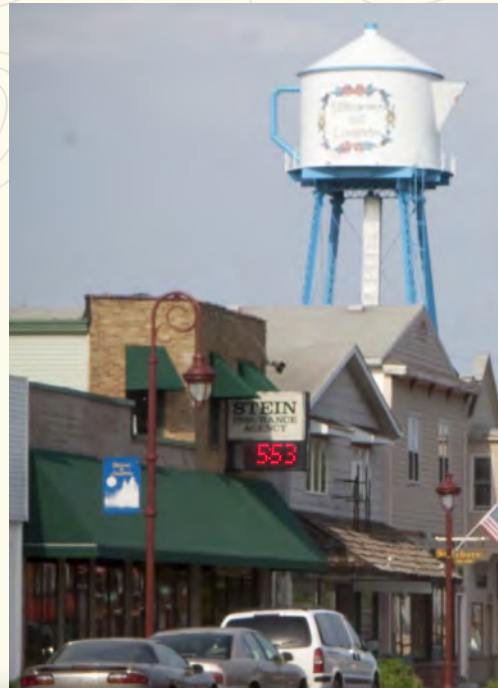
“Extension helped us focus on developing our Swedish connections and understood our wish to do it well, not develop some kind of Swedish theme park,” says John Olinger, Lindstrom’s city administrator.

“Extension’s work has been enduring,” says Olinger. “One thing their analysis discovered about us was that we had a lack of cohesion among the small cities around us as well as within our business community. Since then, we have focused on leadership and we now have a community tourism group.”

“Extension conducts community-specific research,” says Kane. “We analyze the data and provide tools to help communities identify their pathways to economic development. Our research is designed to help communities build upon their assets and navigate the ups and downs of economic change.”

Menahga

Menahga leaders asked for guidance from Extension to help businesses retain customers and expand. Extension research



Every city has different challenges and opportunities. Extension’s community economics educators discover and report on them through community-focused research. One outcome: A bike trail bringing potential customers, including tourists, through the business district in Lindstrom, Minn.



revealed a looming economic threat: lack of senior housing meant many community residents saw no option but to leave Menahga. Since then, Menahga received Legacy funds from the State of Minnesota to support a concert series, conducted a business expo and will soon break ground on a senior housing complex to help keep citizens in their communities.

Murray County

The Murray County Economic Development Authority was the driving force behind an analysis completed by Extension educator Neil Linscheid, who scrutinized visiting

patterns to assess the market for a new hotel. In the end, his analysis showed visitor numbers were not high enough to support added hotel lodgings, but indicated that alternatives—including bed-and-breakfasts—could be worth pursuing.

As Linscheid observes, leaders are deeply committed to securing steady futures in their communities.

“The heroes in the story are the people in communities doing the hard work,” Linscheid says. “Extension helps them be more effective. They’re at the steering wheel. We create the roadmap to help them navigate.”



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Let's cook!

Hands-on nutrition education gets results



"You're the fourth person to come through my line with the same groceries," a store clerk in Walker, Minn., commented about her customer's basketful of colorful vegetables.

A mysterious coincidence? No.

The customer was shopping for a meal she learned to make at a Simply Good Cooking class, part of Extension's Simply Good Eating nutrition program for low-income families. The customers preceding her were classmates making the same leap from learning about nutrition to buying ingredients and preparing a healthy meal at home.

Recent Extension research funded by the U.S. Department of Agriculture

shows that when classes offer a full sensory experience of preparing and tasting the food, participants:

- Cook more meals at home
- Eat more fruit and vegetables, and healthier snacks
- Practice better food safety
- Eat lower-fat dairy foods and more whole grains

Better choices like these reduce obesity and related diseases, improving overall health.

Each year, Extension's community nutrition educators teach 70,000 low-income people throughout Minnesota by working with more than 1,200 groups, schools and agencies.

Extension also delivers Cooking Matters®, a national program that brings in volunteer chefs to teach healthy cooking skills at local classes.

Extension is among the state's top three leaders in building access to healthy foods, according to newly released rankings by Philanthropedia.

When individuals learn to make healthy choices, we all benefit.

Every \$1 spent on nutrition education saves up to \$10 in health care costs.